SIMULTANEOUS COMPARISON OF INTRACORONARY SPECTRAL AND ZERO CROSS FLOW VELOCITY MEASUREMENTS BY DOPPLER ANGIOPLASTY GUIDEWIRE AND CATHETER TECHNIQUES

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Miniaturized Doppler cystals permit measurement of intracoronary flow velocity to assess physiologic and pharmacologic interventions. To compare a new Doppler-tipped angioplasty guidewire with a standard Doppler catheter, we measured mean and peak velocities at rest and during maximal coronary hyperemia with 10mg intracoronary papaverine (PAP). The Doppler guidewire was inserted through a Doppler-tipped guiding catheter to obtain simultaneous measurements in the proximal left coronary artery in 9 pts (17 arteries without coronary stenoses). Guidewire signals were processed by fast Fourier transform analysis. Catheter signals were processed by zero-cross technique. Coronary vasodilatory reserve (CVR) was calculated as peak hyperemic/basal mean velocity (MV). Results (mean±SD):

	MV (cm/sec)		CVR
	basal	PAP	(units)
Guidewire Doppler	29±17	60±15	2.31±0.73
Catheter Doppler	38±24	79±37	2.29±0.92
p value (t-test)	ns	ns	ns
R value (all p<0.01)	0.939	0.769	0.780

These data indicate that the spectral velocity signals of the Doppler-tipped angioplasty guidewire are equivalent to zero-cross velocity data. Although there is a consistently higher MV, in part, due to the more proximal location of the Doppler catheter, the Doppler guidewire provides an additional tool to examine coronary physiology not previously available which may be especially useful for interventional procedures.

PROTECTION AGAINST ISCHEMIA BY DISTAL CORONARY PERFUSION DURING PROLONGED BALLOON INFLATION: COMPARISON BETWEEN THE STACK AUTOPERFUSION CATHETER AND FLUOSOL

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Prolonged balloon inflation has been proposed to improve immediate and long-term success of coronary angioplasty, but requires protection against myocardial ischemia. The protective effects of distal coronary perfusion (DCP) on hemodynamics, rhythm, echocardiographic wall motion index, and pathologic evidence of infarction were studied during a 30-minute balloon occlusion of the left anterior descending artery in closed-chest anesthetized dogs. Two methods of DCP, the Stack catheter(S) and transcatheter infusion of Fluosol(F) at 30 cc/min, were compared with control inflation without DCP(C). Baseline measurements were similar in C, F, and S. Before S or F, a short balloon inflation was used to document abnormal wall motion in the absence of DCP, and to define areas to be scored (from 1(normal) to 5 (dyskinesis)) during prolonged balloon inflations. During the latter, there were no significant changes in any group in heart rate, blood pressure or ST changes. Other results (mean±SD):

Group	LVEDP (mm Hg)	Wall motion index	VT-total (n)	VT-lethal (n)	MI (n)
C (n=13)	7.6±3.6	3.6±0.4	7	3	3
S (n=10)	5.7±1.5	2.4±1.2**	2	0	0!
F (n=11)	19.5±5.5*	2.0±1.3**	2	2	0!

*p< 0.01 vs C and S;!** p=0.001 vs C;! p=0.07 vs C
MI=myocardial infarction; VT=ventricular tachycardia

Conclusions: During prolonged balloon inflation, distal coronary perfusion with S or F reduces ischemic wall motion abnormality and prevents myocardial infarction. The increase of LVEDP with F may be predominantly related to concomitant fluid administration.

ARGON LASER ASSISTED ANGIOPLASTY OF CORONARY SAPHENOUS VEIN GRAFT LESIONS.

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Atherosclerosis of coronary saphenous vein grafts (SVG) poses a therapeutic dilemma. In particular, lesions of SVG over 5 years old tend to have lower success and high restenosis rates with PTCA. To expand the therapeutic options for this population, in a multicenter study we treated 20 SVG with direct argon laser energy to debulk and stabilize the plaque prior to balloon dilatation. Thirteen SVG stenoses (range 80-99%, $\bar{X}$ = 94%) and 7 total occlusions (TO) were treated. Mean graft age was 7.1 years (range .5-15 yrs). Average lesion length was 2.7 cm (range .5-14 cm). Between 13 to 5197 Joules ($\bar{X}$ = 505J) were delivered in multiple exposures (10W, 1-5 sec). Technical success was achieved in 18/20 (90%). Five of 7 TO were successfully recanalized. Mean residual stenosis was 6% (range 0-40%). Complications included MI (1), distal emboli (1), occlusion (1), and atrial arrhythmia (1). No CABG or death occurred. Preliminary life table analysis indicates a 70% patency rate at 6 mos. Complete angiographic follow-up is pending.

Conclusion: Our study suggests that direct argon energy may be safely and effectively applied to SVG lesions. The effect on long term patency requires additional follow-up and assessment.

ROTATIONAL CORONARY ABLATION ACHIEVES LUMEN SIZE COMPARABLE TO BALLOON ANGIOPLASTY WITHOUT STRETCHING THE ARTERIAL WALL

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Percutaneous transluminal coronary rotational ablation (RA) with the Rotablator (Heart Technology, Inc) utilizes a burr which is smaller (70-82%) than normal lumen diameter and also smaller than the inflated balloon with traditional balloon angioplasty (BA). To see if these differences translate to a narrower lumen after RA, we utilized quantitative coronary angiography using the Cardiovascular Angiography Analysis System to measure absolute lumen diameter and percent diameter stenosis before, immediately after and 24 hours after RA in 20 pts (12 LAD, 3 LCX, 5 RCA) and after BA in 14 pts (2 LAD, 2 LCX, 10 RCA). Burr sizes ranged from 1.25 to 2.5mm diameter, mean 2.23 ± 0.25mm (SD). Balloon sizes ranged from 2.5 to 3.5mm diameter, mean 2.79 ± 0.35 (SD). All pts received intracoronary nitroglycerin before and after BA and RA. The data are shown:

	Absolute diameter (mm)			Percent stenosis		
	Pre	Immediate	24 hr	Pre	Immediate	24 hr
BA	1.1±0.4	2.1±0.4	2.1±0.4*	67± 7	33±11	32±13*
RA	1.0±0.4	1.5±0.4	2.1±0.3**	67±14	42±15	31±12**

*p=ns 24 hr vs immediate, **p<0.001 24 hr vs immediate

The RA group demonstrated an increase in luminal diameter (>0.5mm) 24 hrs following the procedure in 14/20 lesions compared with the BA group in which 0/14 demonstrated this increase. This is perhaps due to the resolution of spasm or intimal irregularity after RA. Thus, the net effect is a lumen comparable to that achieved with BA with less arterial wall stress.